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The Role of Knowledge of Vaping and E-Cigarette Use Among Young Adults Aged 18-25 Years

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Walden University
2025

Abstract

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by

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BSc, Indiana University, 2012

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

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Abstract

Vaping is a growing public health concern in the United States among young adults. Despite the belief that vaping is safer compared to traditional smoking, e-cigarettes have become a major public health problem among young adults between the age of 18-25 in the United States. In this qualitative study, the perceptions of the risks of vaping by young adults in Indiana, their lived experiences, and factors contributing to vaping behavior were explored. Based on the Health Belief Model (HBM), the effect of knowledge on perceived risks and reported vaping behavior among the respondents was explored. Ten participants, seven males, and three females, were recruited from the smoking cessation program with the Indiana Department of Health, who had knowledge of e-cigarette use and engaged in vaping behaviors before their participation in the smoking cessation program. Participants responded by email to open-ended questions. Thematic analysis of the data revealed that young adults' experience of vaping was consistent with the previous evidence on vaping and its impacts. The results emphasize that vaping is a social behavior socialization and peer pressure were the key drivers of vaping behavior. Thus, curbing the youth vaping epidemic should be a priority for health education, highlighting the need for positive social change. These findings can be used to inform public health awareness and prevention programs to increase social awareness for reducing social acceptance of vaping behavior.

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Dedication

I dedicate this project to the people who have supported me throughout my education.

Thanks for making me see this adventure through to the end.

Acknowledgments

To my committee members: I am excited to convey my appreciation for my mentor and Committee Chair, Dr. Patrick A. Tschida. Thank you, Dr. Tschida, for your advice and support. Thank you to my Committee Member, Dr. Jeanne Connors, for your willingness to be a part of this project and provide me with constructive input, moving this project to the next level. Drs. Tschida and Connors spent substantial amounts of time and energy in supporting me with this enormous endeavor and my professional development. I honestly thank you both.

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Chapter 1: Introduction to Study

E-cigarettes together with vaping devices have recently become widely adopted throughout the United States (Cornelius et al., 2022; Perez et al., 2021; Villarroel et al., 2020). According to Villarroel et al. (2020) the 2018 US adult e-cigarette user statistics revealed 8.1 million individuals (14.9%) aged 18 and above. The National Center for Health Statistics report revealed that e-cigarette use happened more frequently among adults between 18 to 24 years old compared to older age groups (Villarroel et al 2020). It is further reported by the Centers for Disease Control and Prevention (CDC) in the 2022 that among 47.1 thousand adults in the US tobacco users in 2020s, 3.7% of these are e-cigarette users (Cornelius et al., 2022). It also reported a higher level of use of e-cigarettes (17.6%) in young adults 18-28 years old compared to older groups of people (Cornelius et al., 2022).

In comparison, the 12 month and 30-day e cigarette use prevalence among young adult (18-25 years) was 29.8% and 17.2 % (Perez et al, 2021). Given the high prevalence of e-cigarette use among young adults, it is important to understand factors associated with vaping to develop evidence-based strategies and reverse vaping trends in the US. Preventing and reducing e-cigarette use depends on the understanding of factors associated with product use to implement intervention strategies tailored to a particular age group. All previously mentioned studies suggest that young adults aged 18-25 years have a higher prevalence of vaping compared to older adults and youths but do not mention factors that increase their vulnerability to vaping (Cornelius et al., 2022; Perez et al., 2021; Villarroel et al., 2020).

Young adults in college experience significant life transitions exposing them to risk-taking behaviors (Lanza et al., 2020). Young/emerging adulthood constitutes a developmental period from 18 to 25 years when people achieve significant freedom from their parents and experience changes in social roles (Perez et al., 2021). During this period, many young adults pursue higher education and are free from monitoring by parents and teachers. Moreover, during young adulthood, individuals are also often free from the burden of adulthood. Young adults make life decisions regarding worldviews, education, and leisure. Young adults feel invulnerable to negative life consequences and harbor hedonistic attitudes, increasing participation in risky health behaviors (Kelsh et al., 2023).

Moreover, emerging adults tolerate and celebrate involvement in risky or addictive substances such as drugs, alcohol, cigarettes, and e-cigarettes (Perez et al., 2021). For this reason, I sought to explore whether the experiences and understanding of the health risks associated with e-cigarette usage affect American young adults aged 18-24 years. The findings of my qualitative study provided evidence from the adolescents' experiences about the way the knowledge and perceptions of the health risks of vaping influence their e-cigarette use or vaping behavior. I explored whether positive perceptions about the safety of e-cigarettes compared to conventional cigarettes have contributed to the growing vaping trend among young adults (see Kelsh et al., 2023). Such knowledge may influence targeted interventions and promote social change to control e-cigarette use among young adults.

Background

Studies characterize vaping and e-cigarette use as a growing public health concern among young adults (Atuegwu et al., 2020; Burt et al & Li, 2020; Huang et al., 2019; Mirbolouk et al., 2018; Parekh & Desai, 2020). Findings from a systematic review reported a significant growth in vaping behavior among U.S. adults. The study found an e-cigarette prevalence rate of 4.5%, which represents 10.8 million adults in the US with more than 51.2% of the e-cigarette users being younger than 35 years, with the prevalence being highest among young adults aged 18-24 years (Mirbolouk et al., 2018).

Another study reported similar findings whereby the popularity of e-cigarette usage grew from 4.3% in 2017 to 5.4% in 2014 (Parekh & Desai, 2020). Young adults aged 18-24 years reported a 46.9% increase in prevalence from 9.6% in 2017 to 14.1% in 2018. However, the prevalence varied across US states with the highest prevalence rates reported in Oklahoma at 9.8%, Colorado at 7.3%, and Indiana at 7.1% (Parekh & Desai, 2020). These findings support the public concern about the prevalence of e-cigarette use among U.S. young adults, which may result in nicotine exposure, dependence, and other health risks in this population.

Multiple studies have explored determinants of the vaping trend as the prevalence of e-cigarette use among young adults surpasses conventional cigarette use (Huang et al., 2019; Kanyadan & Ganti, 2019). Studies have examined the role of knowledge and perception, and e-cigarette use among young adults. A cross-sectional study using the Google consumer survey examined the awareness of the properties and impact of vaping among young adults aged 18-24 years in the United States. Seventy percent of

participants only knew about one harmful effect of e-cigarette use despite accessing information about the dangers of e-cigarette use. Furthermore, 65% perceived e-cigarettes as safer than traditional tobacco products (Kanyadan & Ganti, 2019). These findings dispute the misconception that vaping is safer than conventional cigarettes.

Two nationally representative surveys conducted from 2012 to 2017 reported similar findings. Survey findings showed that among former and current young adult smokers, the proportion of e-cigarette users who perceived e-cigarettes as less harmful than tobacco products was significantly higher than those who never smoked (Huang et al., 2019). Another study examined the prevalence of e-cigarette use among U.S. adults from the PATH data. This study shows that the likelihood of using an e-cigarette if it claimed to be less harmful is highest among smokers (Boakye et al., 2022). These findings suggest that e-cigarette use is associated with a lower perception of the health effects of e-cigarettes. Young adults are likely to experiment with e-cigarettes because young adulthood is the developmental period when individuals transition to college and other social contexts with promotion and high tolerance of risky behaviors such as vaping (Boakye et al., 2022; Harrell et al., 2019).

Moreover, the above findings suggest that while most young adult smokers know about the health risks of vaping, knowledge has little or no role in their vaping behavior. Knowledge about e-cigarettes does not deter young adults from vaping regardless of risk perceptions. Indiana is one of the U.S. states with a higher prevalence of e-cigarette use among young adults (Boakye et al., 2022; Parekh & Desai, 2020). The research had

limitations, such as using self-reported data that affects the generalizability of the findings to young adults in other states.

Problem Statement

I explored how experience and knowledge of vaping-related risks, health hazards, and long-term effects influence vaping behaviors among young adults aged 18-25 years in Indiana. Existing studies have identified young adults as having the highest prevalence of e-cigarette use (Cornelius et al., 2020; IDOH, 2021; HHS, 2016). The 2019 National Health Interview Survey (NHIS) data showed that 50.6 million (20.8%) U.S. adults were active users of different tobacco products with 14.0% using cigarettes and 4.5% e-cigarettes, respectively. Young adults aged 18-24 years were also prevalent in the use of e-cigarettes (Cornelius et al., 2020). In 2020, the Surgeon General's report noted that the use of 'current use and ever' of use of e-cigarettes among adults aged between 18 and 24 went up from 6.9% in 2011 to 14.3% in 2014 (Cornelius et al., 2020). In addition, the report indicates that e-cigarette users are more likely than older adults 25 years and up to be 'ever users' of e-cigarettes.

After the vaping epidemic spread among young adults' products, in April 2018, the U.S. Food and Drug Administration (FDA) implemented measures (Berg et al., 2021). Some of FDA's more notable measure involves requiring e-cigarettes to have health warning labels that pertain to traditional tobacco product types (Berg et al., 2021). However, this is still popular among young adults because of the flavors that make e-cigarettes more appealing (Meernik, 2019). The studies have also suggested that factors such as perceptions of risks and benefits influence young adults to use various tobacco

products. The perception that the use of tobacco products has fewer negative effects originates from exposure to favorable attitudes and is thus a major correlation of young adults' tobacco product use (Chinwong et al., 2021). There is an inverse relationship between the perceived risks of tobacco products and the prevalence of use. For example, an online survey of a convenient sample of young adults in Hong Kong exploring the influence of harm perception and e-cigarette use found that the perception of e-cigarettes as less addictive and harmful was associated with increased initiation and use (Jiang et al., 2019).

Different studies explored the role of experience and understanding of the risk of vaping on American young adults' vaping behavior (Adzrago et al., 2021; Jiang et al., 2019; Wackowaski & Delnevo, 2016). A secondary analysis of the 2019 Health Information National Trends Survey (HINTS) found that the perception of e-cigarettes as harmless was associated with daily usage (Jiang et al., 2019). The findings generalized to Indiana's young adults because HINTS is self-reported data subject to underreporting or over-reporting because of recall bias (Adzrago & Fujimoto, 2021). Another secondary analysis of the National Young Adult Health Survey (NYAHS) data investigated the relationship between the perception of harm and e-cigarette use among young adults in the United States (Adzrago & Fujimoto, 2021). The NYAHS does not explore the risk perceptions of e-cigarette use, limiting the generalizability of findings to young adults in Indiana (Delnevo, 2016). Methodological limitations across different studies supported the decision to conduct the present research among young adults in Indiana.

Purpose of the Study

In this study, I explored and broadened the understanding of how young adults' knowledge and perception of the risks of vaping influence vaping behavior. Previous researchers have investigated the perception of risks among adults. However, the findings reported in these studies are not generalizable to young adults in Indiana because of methodological limitations (Adzrago et al., 2021; Jiang et al., 2019; Wackowaski & Delnevo, 2016). Moreover, no found study has explored the role of both knowledge and attitudes toward the risks of vaping on this risky behavior of the target population. Thus, the present study applied the health belief model (HBM) model to investigate how the perception of risk and susceptibility influence vaping behaviors. I intended to find out if young adults will stop vaping if they perceive vaping to be risky and expose them to adverse health outcomes.

Research Questions

I developed the following research questions.

RQ1: What is the experience of vaping risks among young adults in Indiana? The first research question explored young adults' lived experiences with vaping/e-cigarette use, aligning with the qualitative research philosophy. Lived experiences are subjective, supporting the need for qualitative inquiry (Hennink et al., 2020).

RQ2: How do young adults' knowledge of vaping-related health hazards and long-term effects influence vaping behavior? Knowledge of vaping and its influence on vaping behavior is also a subjective variable. The second research question examined how knowledge influenced lived experiences.

RQ3: What factors contribute to engaging in vaping behavior? The third research question focused on uncovering the underlying determinants of vaping behavior. Factors influencing vaping and e-cigarette use are also subjective, aligning with the qualitative approach.

Theoretical Framework for the Study

I adopted HBM because of the model's emphasis on perception and motivation (Luquis & Kensinger, 2019). Rosenstock (1988) developed HBM, a psychological framework explaining and predicting health-related behaviors based on individual attitudes and beliefs. The HBM proposes six constructs motivating people to engage in health-promoting behaviors: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Luquis & Kensinger, 2019). People are more likely to adopt healthy behaviors or engage in preventive health services if perceived benefits outweigh perceived risks and barriers. Therefore, individual perceptions and modifying factors profoundly affect the likelihood of action or behavior change. Behavior change is only possible when perceived health-related risk is severe, susceptibility to risk is high, and engaging in behavior change has higher benefits than costs (Luquis & Kensinger, 2019).

Researchers have used HBM in examining the perceptions of risks associated with the use of various tobacco products in the United States in adolescents (Chinwong et al., 2021). Insights from these studies influenced the decision to apply the HBM to vaping and e-cigarette use among young adults. Behavior change among young adults depends on personal perceptions about the perceived costs and benefits of vaping and e-

cigarette use (Luquis & Kensinger, 2019). Thus, I hypothesized that young adults were more likely to stop e-cigarette use if they perceived vaping as exposing them to severe health risks. According to the HBM model, high-risk behavior promotes behavior change based on susceptibility and severity constructs. Thus, behavior change is about weighing the benefits against the costs of vaping/e-cigarette use (Chinwong et al., 2021). However, cues to action and self-efficacy determine the sustainability of behavior change. Cues to action and self-efficacy were beyond the scope of the present research.

Nature of Study

In this qualitative research, I explored how young adults' knowledge and understanding influenced their vaping behavior. The qualitative research approach allows researchers to explore and understand the individuals assigned to social problems (Creswell, 2018). Qualitative research is ideal for studies examining research subjects' living experiences and behavior (Creswell, 2018). I collected data about participants' knowledge of e-cigarette risks and motivating factors. This information was useful for exploring vaping behaviors and quitting intentions. I also collected information about participants' age, race, and gender.

Definitions

Conceptual definitions of key terms for the research are as follows:

Emerging adulthood: "The life developmental period between adolescence and young adulthood," defined in research as the age between 18 and 25 years (Kelsh et al., 2023, para. 1).

E-cigarettes (electronic cigarettes): A battery-powered device shaped like a pen or cigarette containing nicotine and flavoring solution inhaled into the lungs (National Cancer Institute, 2021).

E-liquids: "Liquids containing nicotine, flavorings, and propylene glycol converted into vapor by e-cigarette devices" (Armstrong-Mensah et al., 2019, p. 359). They appeal to adolescents because of their flavor (Armstrong-Mensah et al., 2019).

Pre-existing health conditions: "Declinable medical conditions maintained by more than half of insurers, which include HIV/AIDs, lupus; alcohol and drug abuse; mental disorder such as depression, cancer, severe obesity, and coronary artery disease" (Huguet et al., 2019, p. 883).

Vaping: The behavior of using e-cigarettes to deliver nicotine (Bernat et al., 2018)

Vaping devices: These are battery-powered devices such as vapes, and hookah pens that individuals use to inhale an aerosol containing nicotine, other chemicals, and flavorings (Huguet et al., 2019, p. 883).

Assumptions

The first assumption I made in this study was that young adults in Indiana are knowledgeable about the health risks of vaping. I also assumed that this knowledge could potentially influence young adults' vaping behavior. These assumptions derive from the constructs of the HBM theoretical framework used in the study, especially the perceptions of the benefits or costs of a particular behavior (see Chinwong et al., 2021). The second assumption was that young adults' experience of vaping risks depends on their age and gender. This assumption was drawn from past research findings related to

the present study problem, showing that perceptions of health risks of e-cigarette use among young adults differ with age, gender, and ethnicity (see Adzrago et al., 2021).

Scope and Delimitations

The research included young adults aged 18-25 years given that they have the highest prevalence of e-cigarette use compared to youths and older adults. I sought to understand the experiences of vaping risks in the research population and the role of knowledge of vaping-related health risks, focusing on short- and long-term effects. I explored the relationship between knowledge of risks and vaping behaviors. I did not examine the effectiveness of interventions improving vaping-related knowledge or programs promoting behavior change. The research only focused on young adults aged 18-25 years. The exact definition of young adults is diverse across different studies. Some defined young adults as those aged between 18-25 years while others reference the 18-29 age group. Despite the variations, most studies include young adults aged 18-25 years.

Limitations

The research had notable limitations. First, the small sample size could affect the validity and reliability of the findings. The small sample size could undermine the external validity of the findings. Second, the cross-sectional design did not allow causal inferences between variables, undermining transferability. The qualitative approach generated subjective information lacking scientific plausibility.

Significance

The research findings will increase understanding of vaping knowledge and use among older adults in Indiana. This information can inform public health interventions to reverse the growing vaping trend in the community. Research findings may promote social change by influencing e-cigarette use policies and preventive interventions targeting young adults. Moreover, the results from the study may change the way public health officials create messages targeting young adults to prevent them from e-cigarette use or vaping. Research findings support programs promoting cues to action and self-efficacy.

Summary

In this chapter, I introduced the phenomenon of interest, including background information. Vaping and e-cigarette use are significant public health concerns in Indiana and nationally. I established the foundation for the research, highlighting the problem statement, research purpose, underpinning theoretical framework, research scope/nature, definition of key concepts, and limitations/delimitations. In the next chapter, I present a literature review of published research. The literature review is important because no single study has explored both the experience of vaping risks and the influence of knowledge of health risks on vaping behaviors.

Chapter 2: Literature Review

The IDOH (2021) has identified e-cigarette use among young adults as a growing public health concern. Thus, I explored whether knowledge of vaping-related health risks influences behavior change among young adults in Indiana. Previous studies examining e-cigarette use in this population group have methodological limitations affecting the validity and reliability of published research evidence. My research filled this gap by exclusively including young adults in Indiana. In this chapter, I presented a comprehensive literature review of published evidence. This chapter includes the literature search strategy, theoretical and conceptual framework, and key themes from the literature.

Literature Search Strategy

The first step of the literature search strategy entailed formulating a researchable question consistent with the research title. The research question was as follows: How does the knowledge of vaping and e-cigarette use influence vaping behavior among young adults aged 18-25 years? Key search terms derived from the research question included *vaping, e-cigarette use, young adults, knowledge, vaping behaviors, health belief model,* and *behavior change*. The second step involved conducting preliminary online research via Google Scholar to gain an overview of the topic. I reviewed articles retrieved from Google Scholar to learn more about the topic of interest and refined search terms. The third step was to run the search terms through four electronic databases: MEDLINE via PubMed, CIHNAL, Embase, and the Cochrane Library. Boolean connectors/operators and medical headings were used to limit the search to the most

relevant articles (Purssell & McCrae, 2020). The fourth stage entailed a review of abstracts for their relevance and appropriateness to the research topic. The final phase entailed the process of retrieving full articles with a view of synthesizing and adding the same to the literature review.

Theoretical Foundation

In order to explain participants' behavior, I applied the HBM. Kim & Kim (2020) emphasize on how people's attitude and perceptions affect their behavior. HBM is a psychological framework that describes and predicts health behavior by individuals' attitudes and beliefs. Six constructs of the HBM to motivate people to engage in health promoting behaviors are proposed as perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self efficacy. This HBM holds that when one believes that he is susceptible to a problem or condition, actions to benefit the condition are needed, the consequences of such condition are severe, then the individual should try to protect his health (Devi et al., 202, Kim & Kim, 2020).

Analysis of Core HBM Constructs

Perceived susceptibility indicates that people who are more likely to have a health problem start engaging in habits to reduce the chance of falling prey to such health problem (Chinwong et al., 2021). Health promoting behavior occurs among individuals who embrace a given health promote behavior when they perceive a particular behavior to have severe health consequences (Chinwong et al., 2021). The person who is looking at the perceived benefit or efficacy of being on behavior to decrease risk is considered as a perceived benefit/barrier construct. The perceived barriers focus on the personality

assessment of the hurdles to behavioral change such as costs, discomfort, or inconvenience. An individual engages in healthy behavior if the perceived benefits outweigh the perceived risks and barriers. The opposite is also true. Self-efficacy refers to the person's perception of their ability to adopt and sustain healthy behaviors. Finally, cues to action are internal or external triggers that prompt action. Psychosocial and demographic variables such as family income, age, and sex influence individual perceptions (Kim & Kim, 2020).

HBM's Origin/Source

Rosenstock and other social psychologists at the U.S. Public Health Service developed HBM in the 1950s. Rosenstock in the 1950s developed the framework in response to the free tuberculosis (TB) health screening program's failure to increase the number of adults using free TB screening services (Rynhoud, 2021). The social psychologists investigated factors influencing screening rates, discovering that perceptions of risks and benefits motivated screening behaviors. HBM was developed to predict and explain preventive health behavior (Devi et al., 2022; Kim & Kim, 2020). The HBM explains the role of psychological and social factors in determining health-related behaviors. The social psychologists' original goal in developing the HBM was to enhance individual efforts for people "trying to improve the public health by understanding why they failed to adopt preventive health measures" (Kim & Kim, 2020, p. 3).

Empirical Application of the HBM

Multiple research studies have applied the HBM to investigate knowledge and perception of health effects related to vaping among young adults. One study investigated how knowledge, attitudes, and perceptions of vaping-related risks influence e-cigarette use among undergraduate students aged 18-16 years from a large southwestern university based on the HBM (Bennett et al., 2022). Findings from this study shows that e-cigarette users has positive attitudes toward e-cigarette use compared with nonusers. Undergraduate students perceiving e-cigarettes as healthier and less harmful have positive attitudes toward vaping. However, these results are not generalizable because of a small sample size drawn from a single southwestern university (Bennett et al., 2022).

A second study investigated risk perceptions of e-cigarettes and associated e-cigarette use behavior among young adults aged 18-35 years in Hong Kong (Bennett et al., 2022). The research entailed administering an online survey questionnaire to a convenient sample of young adults. Findings from the study show that e-cigarette perceptions are not related to regular e-cigarette use (Jiang et al., 2019). These findings contradicted those reported in the first study. According to Bennett et al. (2022), a low-risk perception of e-cigarettes predicted increased e-cigarette use. The two studies generated divergent results, but these studies provide an empirical basis for HBM. Findings from the two studies have shown that HBM is useful in understanding behaviors related to e-cigarette use and health-promoting behaviors.

The Rationale for the HBM

The application of the HBM allowed me to explore the mechanism underlying young adults' knowledge of health risks influencing their vaping behavior. The HBM constructs such as perceived susceptibility, perceived severity, perceived benefits/barriers, and cues for action were useful in explaining the young adults' vaping behavior in detail (Kim & Kim, 2020). The HBM model was appropriate because it explained young adults' vaping behaviors based on their beliefs and attitudes (Jun et al., 2022). Knowledge alone does not necessarily influence behavior but shapes young adults' attitudes and beliefs about vaping.

The HBM Relation to the Study

I used the HBM to explore young adults' experience of vaping risks and how this knowledge influences vaping behaviors. I hypothesized that young adults in Indiana would cease vaping if they perceived themselves susceptible to vaping-related health risks. Moreover, I examined how knowledge about benefit perceptions influenced vaping behaviors negatively or positively. I also explored knowledge as an important cue to action. I considered how external factors such as health programs and media shaped young adults' understanding of risk and benefit perceptions. I investigated the influence of participants' demographic characteristics such as age, sex, and ethnicity. Male adults showed higher rates of e-cigarette usage according to NHANES data while non-Hispanic Black adults represented the smallest user group according to Jaber et al. (2019).

Literature Review Related to Key Variables and/or Concepts

E-Cigarette Use and Vaping Habits

According to research from Bennett et al. (2022) and additional studies from Dai & Leventhal (2019) and Jaber et al. (2018) and Mirbolouk et al. (2018), vaping has increased substantially among young adults since 2013. According to Bennett et al. (2022) in their systematic analysis of NHANES 2013-2014 survey data e-cigarettes ranked second in popularity after cigarettes while cigars also appeared as a widely used tobacco product. Adults between 18 to 39 years old showed the most significant use of e-cigarettes according to the analysis by Jaber et al. (2018). The high prevalence reported in the latter study is consistent across other studies in the United States. For example, an analysis of the 2016 Behavior Risk Factor Surveillance Data found that 2.8 million (9.8%) young adults aged 18-24 years had the highest prevalence of e-cigarette use although the vaping prevalence varied among states (Mirbolouk et al., 2018).

Moreover, findings from a systematic review of NHIS data showed that the prevalence of e-cigarette use increased from 5.1% in 2014 to 7.6% in 2018 while declining in older adult groups (Dai & Leventhal, 2019). Findings from a longitudinal study of young adults in six metropolitan areas in the United States showed that e-cigarette initiation among younger adults was 4.5% compared to 3.6% for conventional cigarettes during the pandemic (Bennett et al., 2022). Vaping behavior among young adults is rising despite research evidence documenting the health risks of e-cigarette use. Knowledge levels are higher among young adults although incidence and prevalence rates are higher in this population group than in older adults (Mirbolouk et al., 2018).

More studies will need to determine whether knowledge and perception of risks account for high prevalence among young adults.

Vaping and E-Cigarette Use by Ethnicity

Research studies have documented ethnic/racial variations in e-cigarette use among young adults (Atuegwu et al., 2020; Bennett et al., 2022; Mayer et al., 2020). A longitudinal study examined predictors of e-cigarette initiation and cessation among young adults in the United States during the coronavirus pandemic. Findings from this study showed that ethnicity was one of the socio-demographic factors influencing e-cigarette initiation (Bennett et al., 2022). Other studies conducted in the United States have reported comparable results. For example, one study found that young adults aged 18-34 years identified as never-smokers reported current e-cigarette use. Of these, 48.4% were White non-Hispanics and 13.7% were Black non-Hispanics (Atuegwu et al., 2020). Conversely, a cross-sectional study based on the 2019 Tobacco USE Supplement to the Current Population Survey data found that the prevalence of vaping was high among multiracial men (4.5%), followed by 4.2% of Indian/Alaskan natives and 2.8% non-Hispanic white (Mayer et al., 2020). These mixed results serve as a reminder that additional research studies are necessary to determine what role ethnicity and race play as important factors for vaping.

Vaping and E-Cigarette by Age

Vaping and e-cigarette use have been documented differently according to age in research studies (Atuegwu et al., 2020; Bennett et al., 2022; Mayer et al., 2020). Studies have shown that the use of e-cigarettes decreased with age among young men (Atuegwu

et al., 2020). It has been reported by other studies that younger adults are more likely to use e-cigarettes than are older adults. Longitudinal studies have also found that e-cigarette users who started e-cigarette utility during the pandemic were significantly younger with a lower perception of e-cigarette use risk (Bennett et al., 2022). In addition, a higher percentage—63.4%—of vaping adults were aged 18 to 24 years old and 23.8%—aged 25 to 34 years old— (Mayer et al., 2020). Nonetheless, another study identified that young adults who began using e-cigarettes were living in Oklahoma City more than they were in Atlanta (Bennett et al., 2020). This shows the existing variations in the US cities as well as states.

Vaping and E-Cigarette Use by Gender

E-cigarette use and young adults' perception research findings have been documented to have gender variations (Al-Hamdani et al., 2021; HHS, 2016). For instance, HHS (2016) reported that the prevalence of e-cigarette users among adults of 18 to 24 years was higher among men than women. The studies show that the prevalence of the e-cigarette is dependent on the differences in perceptions and experiences in vaping by male and female young adults (Al-Hamdani et al., 2021). An online survey of young adults (aged 18 years and older) was utilized to find gender differences that influence e-cigarette use, initiation, and continued e-cigarette use. A reason males gave for starting e-cigarette use is cessation of smoking, curiosity and of concern about health implications of smoking. Reasons for women's initiation of e-cigarette use were attributed to the influence of family and friends. In addition, e-cigarette users had more positive beliefs

regarding e-cigarette use and addiction among the male participants than female participants (Jun et al., 2022).

Pre-Existing Health Conditions

Research findings have examined how preexisting health conditions influence vaping behaviors. Health conditions reported in the literature include stress, depression, and asthma (Alanaz et al., 2020; Cabral, 2022; Pericot-Valverde et al., 202; Resano et al., 2022). The studies show a positive correlation between stress/depression and vaping in adolescents (Cabral, 2022; Pericot-Valverde et al., 202; Resano et al., 2022; Sikka et al., 2021). Findings from an online survey conducted during the COVID-19 pandemic investigated the relationship between stress and e-cigarette use among emerging adults in the US. Findings from another study show that psychological distress factors significantly influenced intentions to use e-cigarettes and current e-cigarette use in both male and female participants (Cabral, 2022).

Similarly, findings from a randomized controlled pilot study found that exposure to stressors influenced vaping behavior among young adults (Pericot-Valverde et al., 2021). Research evidence has also shown that emerging adults with chronic conditions such as asthma are less likely to engage in vaping behavior (Alanaz et al., 2020). An analysis of the 2018 Behavioral Risk Factor Surveillance System survey data showed that e-cigarette use was significantly higher among asthmatic emerging adults than among nonasthmatic peers (Alanaz et al., 2020). However, another study found insufficient evidence to support the relationship between stress and e-cigarette use among university students in the United States (Resano et al., 2022).

E-Cigarette and Vaping Patterns by Parents, Siblings, and Friends

Smoking behaviors by parents, friends, and siblings are major factors associated with vaping/e-cigarette use among young adults (Resano et al., 2022; Sikka et al., 2021). Findings from a study conducted in the Philippines showed higher vaping rates among students whose family members and peers were vapers compared to those with non-vaping family members and peers (Resano et al., 2022). Another study of six adult patients enrolled in the Tobacco Treatment Clinic for e-cigarette usage reported similar findings (Sikka et al., 2021). Findings from this study showed that peer usage significantly influenced participants' vaping behavior. Peer usage combined with stress predisposed participants to vaping behavior. Findings from a meta-analysis revealed a positive correlation between e-cigarette use by young adults and smoking behavior by their relatives and friends (Kelsh et al., 2023). Another study characterized family members' and peers' influence as social facilitation. The reason for this phenomenon is when young adults begin vaping for social respect (Harrell et al., 2019).

E-Cigarette Use and Vaping by Socioeconomic Status

E-cigarette and vaping behaviors are influenced by young adults' socioeconomic status (SES). There have always been research studies that have shown how SES makes young adults more prone to vape behavior (Kock et al., 2020; Stallings-Smith & Ballantyne, 2019). There is one study that demonstrated an association between socioeconomic characteristics including employment status, poverty level, or lack of education and e-cigarette use. The study revealed further how employed adults were more likely to use e-cigarettes than unemployed individuals. Individuals are more likely

to use e-cigarettes if they are young adult with incomes below the federal poverty line than if they are young adult with incomes above the federal poverty line (Stallings-Smith & Ballantyne, 2019). Studies outside the United States, however, have come up with different findings. For example, cross sectional evidence from the UK reported that the use of e-cigarettes was 2.82% percent of adults in 2014 and increased to 4.9% percent for adults in the highest socio-economic categories in 2019. In the same period, the use of E-cigarettes also rose from 1.7 to 3.31 among adults from lower socioeconomic groups (Kock et al. 2020).

Purchasing Behaviors

Different researchers have looked how young people's buying behaviors affect their vaping behavior. Another study took a look in how the pandemic restrictions shape the purchasing behavior of young people. Access to gas stations and vape shops was restricted by social restrictions, but vaping rates increased during the pandemic (Gaiha et al., 2020). Results from a cross-sectional online survey of young adults in March 2020 showed that young adults easily could get e-cigarette products in vape shops, from online purchasing, and have dealers send products to them or friends. After the pandemic, most young adults switched to buying e-cigarettes online purchasing (Gaiha et al., 2020). The findings indicate that ease of purchase is related to the continued e-cigarette use among young adults.

Knowledge About Vaping

There has been attention paid in literature to knowledge of vaping related heath risks. Findings from a cross-sectional study examining the association between

knowledge, anxiety, and self-efficacy and vaping among college students aged 18-25 years, Jones et al. (2021), found that 24.8% of participants reported regular use, 11.5% rare use, 7% everyday use, and 6.5% reported vaping. ANOVA analysis showed a significant impact of knowledge on e-cigarette use by regular users compared to never users. Post hoc comparisons indicated that participants who never used e-cigarettes had significantly higher mean scores for knowledge (Jones et al., 2021). The findings are consistent with those reported in previous studies demonstrating how knowledge of the health risks of e-cigarettes influences vaping behavior (Cuccia et al., 2020). However, findings from a study conducted at a university in the Philippines found that knowledge was not a significant predictor of e-cigarette use among university students (Resano et al., 2022).

According to the 2016 Surgeon General Report, the perception of the risk of e-cigarettes among young adults in the United States relative to conventional cigarettes is lower among current and former users. The report specifically found that 53.8% considered e-cigarettes moderately harmful, 19.4% considered not harmful, and 26.8% considered them harmful (HHS, 2016). Current and ever users reported that e-cigarettes were not harmful, while never users rated e-cigarettes as very harmful (HHS, 2016). Research on cessation behavior among young adults found that harm perception was associated with intention to quit e-cigarette use (Cuccia et al., 2020). The reviewed studies show that young adults have extraordinarily little or no knowledge about the health risks of e-cigarettes, influencing their perception of e-cigarettes as less harmful.

Dependence, Intention to Quit, and Quit Attempts

Research studies have correlated continued e-cigarette use with dependence, intention to quit, and quit attempts (Cuccia et al., 2020; Gaiha et al., 2020). Findings from a cross-sectional online survey of participants aged 18 to 24 years found no meaningful change in e-cigarette use among young adults during the COVID-19 pandemic. Only 24.9% of young adults self-reported quitting e-cigarette use. The factors associated with quitting e-cigarettes among participants included dependence and frequency of use. Participants were less likely to quit if they had used e-cigarettes frequently and were nicotine dependent (Giaha et al., 2020). Another study investigating e-cigarette cessation behavior among young adults aged 18 to 24 years found that only one-third of this age group had quit intentions. This study showed that intention to quit was associated with harm and dependence perceptions. However, there was a negative association between intention to quit and frequent daily e-cigarette use (Cuccia et al., 2020).

Summary and Conclusion

The synthesis of research literature has revealed increasing cases of vaping among young adults despite their knowledge of health risks. The reviewed studies show that young adults have knowledge about e-cigarettes, which is a prerequisite for use. Other important trends from the reviewed studies are that e-cigarette use differs by age, ethnicity, gender, and socioeconomic status. Young adults are more likely to use e-cigarettes than older adults. Lower socioeconomic factors are associated with increased e-cigarette use though findings are inconsistent about the association of socioeconomic factors and vaping behavior. Family members, siblings, and friends also influence young

adults' behavior with the initiation of e-cigarette use. Overall, the studies reviewed here show these factors influence young adults' susceptibility to vaping behavior. However, it is impossible to generalize the findings of these studies to other states such as Indiana because of methodological problems. Moreover, the cross-sectional nature of the studies does not establish the causality between the young adults' experience and knowledge of health risks and vaping behavior.

Chapter 3: Research Methodology

Research Design and Rationale

The three research questions are as follows:

RQ1: What is the experience of vaping risks among young adults in Indiana?

RQ2: How do young adults' knowledge of vaping-related health hazards and long-term effects influence vaping behavior?

RQ3: What factors contribute to engaging in vaping behavior?

I examined and provided an understanding of how young adults' knowledge of e-cigarette risks of vaping influences their vaping behavior. As mentioned earlier, this study was informed by the growing problem of young adults vaping in Indiana. The key elements of the research design are tasks involved in conducting the study or the relationships between different elements of the study from research questions, phenomenology tradition, methods, data collection, and analysis.

Methodology

This was a qualitative study where I explored young adults' experience and knowledge of vaping health hazards. I examined how this knowledge influences young adults' vaping behaviors. This research methodology entailed collecting and analyzing nonnumerical data. Qualitative research acknowledges the subjective nature of human experience (Hennink et al., 2020). Researchers often immerse themselves in the context of the study to gain a deeper understanding of participants' perspectives. Therefore, qualitative research emphasizes the importance of context in shaping human behavior and

experiences. Researchers seek to understand how cultural, social, and environmental factors influence participants (Hennink et al., 2020).

Participant Selection Logic

The number of participants depends on the representativeness, population characteristics, and type of data-qualitative data. Therefore, I used a sample size of ten participants for a semi-structured and in-depth email interview. The selection of this small sample size of participants aligned with the rationale that the sample of participants for qualitative research is smaller than those found in quantitative research because the former is labor intensive, and analyzing a large sample is impractical because of time constraints (Tracy, 2024). However, there is a need to ensure that a sample in a qualitative study is large enough to cover the diverse opinions of the different participants. Through a systematic review, I found that the most appropriate sample size for qualitative research-based phenomenology and grounded theory paradigms is ten interviews. This suggests that even a sample size of ten for the present study was reasonable because the most important aspect of qualitative study is quality rather than quantity (Hennink et al., 2020).

I conducted email interviews with participants until data saturation was reached. Data saturation refers to the point when, through the course of data collection, I began to hear the same opinions and comments repeatedly from the participants, a suggestion that more email interviews would be unnecessary. Qualitative research's sample size should not be too large because the data collected will become repetitive and redundant (Hennink et al., 2020).

Instrumentation

I employed semi structured, email interviews with the participants. The data collection approach was appropriate to examine the sensitive behaviors among adults and related perceptions. I created the email interview based on the research objective, HBM constructs, and existing literature regarding young adults' knowledge of the health hazards of vaping, e-cigarette use, and vaping behaviors. Appendix A includes the interview questions.

Procedures for Pilot Study

I conducted a dry-run test with an expert in the field to assess the suitability and feasibility of the interview questions. The expert reviewer ensured that the interview questions aligned with the research purpose and questions. I used the expert's feedback to refine the email interview questions with a purposive sample of 10 participants. The pilot test was necessary to detect potential flaws and areas requiring such adjustment before data collection (Gani et al., 2020). The expert review and pilot testing established the content validity. Rational analysis by experts familiar with the research subject provides for the research instrument's content validity by reviewing the questions for clarity and comprehensiveness (Tracy, 2024).

Procedures for Recruitment, Participation, and Data Collection

Based on the research purpose, questions, and design, I employed a purposeful sampling strategy. Purposeful sampling is an appropriate approach to deeply investigate and understand the phenomenon of the research using a sample that gives in-depth information (Tracy, 2024). Moreover, it ensures sample selection from the target

population based on the characteristics of interest (Hennink et al., 2020). Since purposeful sampling is divided into judgment, quota, and snowball sampling, I used snowball sampling to reach the potential participants because of the sensitivity of the topic, making young adults reluctant to talk about e-cigarettes.

I recruited potential participants after informing them about the purpose of the study and getting approval. Finally, I posed screening questions to potential participants to assess their eligibility based on the inclusion and exclusion criteria. Appendix B includes the screening questions. The inclusion criteria were aged 18-25 years old, Indiana residents able to read and speak English, and willingly consent to participate in the study.

The open-ended research questions assessed young adults' experience and knowledge of the harms of e-cigarettes. Possible sources of this information/knowledge included product advertisements and health promotion campaigns. In the interview, I also explored how participants' knowledge influenced e-cigarette use/vaping behavior. I established a rapport with the participants to facilitate better responses to interview questions. The process involved active listening and adaptive questioning. Active listening created an environment of mutual trust where the respondents openly responded to the questions (Brinkmann, 2022). Adaptive questioning allowed me to start with icebreakers before proceeding to complex/uncomfortable questions (Brinkmann, 2022). The email interview questions included probes to explore specific details about sources of vaping-related health hazards and how they influence young adults' behavior. I also used close-ended questions to assess e-cigarette favorable/unfavorable perceptions. I also

asked participants to identify their favorite source of information regarding the health hazards of vaping, including peers, relatives, siblings, online/social media, friends, doctors, parents, and others.

Data Analysis Plan

Data analysis commenced with transcribing email interviews responses. I employed thematic analysis to identify, analyze, and report themes in the data. Thematic analysis entails identifying, analyzing, and reporting patterns, (i.e., themes) within empirically collected qualitative data (Firdaus, Aksar, & Gong, 2024). I read and reread transcribed documents and emailed interview responses while noting recurrent information and themes. This step was crucial because I intended to combine manual and electronic data analysis. I specifically employed NVivo 10 Software to thoroughly examine the interview transcripts to identify accurate, recurring themes. The NVivo 10 analytical power was useful in coding and categorizing insights from the interview transcripts. I developed the codes based on the research questions and concepts that emerged as the participants answered interview questions.

Issues of Trustworthiness

Selecting an appropriate unit of analysis, data collection method, and sampling strategy are significant trustworthiness issues in qualitative research (Firdaus, Aksar, & Gong, 2024). Other trustworthiness issues relevant to the present research included the systematic and logical presentation of the results/findings. The four methods for assessing the trustworthiness of the present study were credibility, transferability, dependability, and conformability.

Credibility

Studies achieve credibility through multiple methods or sources to produce coherent results (Brinkmann, 2022). I interviewed a diverse sample of young adults in Indiana to enhance the credibility of the research findings. Second, I continuously engaged participants throughout the data analysis process to confirm and clarify their responses. The goal was to ensure that I captured the participants' real intentions (Purssell & McCrae, 2020). However, the use of semi structured interviews as a method of collecting data affects the study's ability to achieve credibility criteria, especially on the data about young adults' experiences of vaping risks, and the influence of knowledge of the health hazards of e-cigarettes on vaping behavior.

Transferability

This study did not meet transferability criteria because of the use of the small sample size. External validity is a major methodological limitation in qualitative studies because of its small size (Brinkmann, 2022). Qualitative studies employ nonprobability sampling techniques and small sample sizes to explore a research phenomenon and generate detailed data. Consequently, it is difficult to transfer qualitative findings to other settings (Brinkmann, 2022). Nonetheless, in-depth descriptions enrich quantitative findings. Researchers can use qualitative findings to inform larger quantitative studies or support the development of health promotion interventions.

Dependability

Dependability depends on how well qualitative researchers describe sample selection methods, data collection approaches, and data analysis procedures influence

(Brinkmann, 2022). The study explicitly discussed research methods, sampling procedures, data collection, and analysis procedures. The results of this study were dependable because of the explicit description of research methods, including their rationale.

Conformability

The aspect of conformability refers to the extent to which a researcher maintains an objective position. Qualitative researchers struggle to be objective and neutral considering the subjective nature of qualitative research. Qualitative researchers can overcome this challenge by ensuring that they do not influence the research process and results (Brinkmann, 2022). I achieved this goal by emotionally detaching myself from the study participants to avoid intimate/close relationships that could influence the research outcomes. This approach allowed me to collect objective and accurate data.

Ethical Procedures

Ethical considerations are critical in this qualitative research because the data collection methods will intrude into the participants' lives. The first ethical consideration was obtaining Institutional Review Board (IRB) approval. Walden University's Institutional Review Board (IRB) approved the dissertation; the approval number was 04-09-24-0382855 The IRB approval process ensured that the research adheres to ethical principles of informed consent, autonomy, beneficence, and nonmaleficence (Hennink et al., 2020). The research involved human subjects, raising significant ethical considerations. Ethics, both in primary and secondary research, is based on the philosophy of informed consent. I allowed the research participants' right to autonomy by

providing them adequate and comprehensive information on it. This provided research purpose, potential benefits and risks information. The consent form that the interviewees signed before the interviews is placed in Appendix C.

Privacy and confidentiality are critical ethical considerations. I employed different strategies to ensure data privacy and confidentiality. First, I de-identified all the transcripts by ascribing to each participant a unique identifier. I assigned the pseudonym "John Doe" to male participants and "Jane Doe" to female participants. Second, I shredded all transcripts after scanning and safely storing them on an encrypted hard drive. Finally, I only used the collected data to fulfill the program's academic requirements. Thus, I will neither share nor distribute the data for external use.

Summary

This chapter presents the research methodology, including research design, sampling strategy, research instrument, data analysis, and ethical procedures. I employed a qualitative research approach to explore the phenomenon of interest. The qualitative approach allowed me to gather in-depth information about vaping-related knowledge and its influence on vaping behavior among young adults in Indiana. I used the purpose-sampling strategy to draw a sample of ten respondents. The respondents completed online interviews administered via email. The sampling and interview processes continued until the point of saturation and redundancy. I analyzed qualitative data using thematic analysis. I used NVivo software to organize and draw meaningful themes from raw qualitative data. The next chapter presents the main research findings.

Chapter 4: Results

The purpose of this qualitative study was to understand the experience of vaping risks among Indiana young adults aged 18-25 years and explore how their knowledge of health risks related to vaping influences their vaping behavior. This chapter includes information on the data collection procedures, data analysis, and the results.

Setting

I collected qualitative data using email interviews that allowed for the efficient and cost-effective collection of data. Unlike in the case of real-time interviews, all young adults recruited for the study responded to email interview prompts at a time suitable and convenient to them.

Demographics

The study included young adults aged 18-25 years old, drawn from racially and ethnically diverse populations. The demographics included age, gender, and current e-cigarette use. The study included ten subjects based on the saturation principle of qualitative research. Data saturation occurs when a qualitative researcher has gathered enough data to draw meaningful conclusions (Braun and Clarke, 2021). Further data collection yields diminishing returns by not providing any new information or insights.

Table 1: ***Participant Demographics***

Variables		Total numbers	Percentage
Gender	Male	7	70%
	Female	3	30%
Race/ethnicity	Caucasian	3	30%
	African American	3	30%
	Asian American	2	20%
	Multiracial	2	20%
Age	18-20	4	40%
	21-24	6	60%
Education level	College	10	100%
e-cigarette use	Ever vaped	10	100%
	Never vaped	Nil	Nil
	Users	7	70%
	Non-users	3	30%
Knowledge of health risks of vaping	E-cigarettes are healthy	7	70%
	e-cigarettes are unhealthy	3	30%

Data Collection

I collected data from ethnically/racially diverse young adults ages 18–25 years old. The young adults were eligible if they had a current or history of vaping. I recruited all participants from Indiana Prevention and Cessation, a program that is part of the IDOH. Participation in the study was voluntary to uphold the ethical principle of autonomy. As such, I invited all participants to volunteer via email, and consent forms were sent via email. Participants consented to take part in the research if they replied to the email correspondence and returned an electronically signed consent form. I then emailed an interview questionnaire to each consenting participant.

Data Analysis

The data analysis process entailed thematic analysis to identify, analyze, and interpret themes within data. I reviewed the transcripts to structure and organize raw data. The process allowed me to ensure data quality by addressing inconsistencies or errors in the information collected. The data analysis process involved manual and electronic approaches. The NVivo 10 Software was employed to thoroughly examine the interview transcripts to identify accurate, recurring themes and to leverage the NVivo 10 analytical power to code and categorize insights from the transcriptions. The codes were based on the research questions and concepts that emerged as the participants answered interview questions.

The codebook was developed and included the following codes: ever-vaped, current e-cigarette use, social benefits, regular/occasional use, e-cigarettes and friends, peer pressure and e-cigarettes, awareness of health risks, smoking cessation, and e-cigarette advertising policy/usage. The coded interview transcripts were analyzed using thematic analysis, an inductive process that involved closely examining the coded interview transcripts and identifying patterns/themes that emerged across interviews. The transcripts were reviewed to select the most appropriate representative quotes for each identified theme. These quotes were cited as confirming or disconfirming evidence of the identified themes.

The next section presents four themes that emerged from the data analysis process. Each theme includes quoted responses attributed to different participants. I used pseudonyms to de-identify participants. The seven male participants were assigned the

pseudonym John Doe 001-007. The three female participants were assigned Jane Doe 001-003.

Evidence of Trustworthiness

I enhanced trustworthiness, particularly credibility through prolonged engagement with the respondents. Specifically, I constantly emailed each respondent to seek clarification on ambiguous or unclear statements. The goal here was to ensure that I only captured what the respondents intended to communicate rather than my interpretations. Transferability was challenged but I aimed for an in-depth description of the methods of data collection, contextual information, and analysis methods. This approach was congruent with Stahl and King's (2020) assertion that transferability is possible through a deeper description of the contextual information about the research field. The third aspect of trustworthiness is dependability. I sought feedback from participants regarding their insights to confirm or refine their findings. I pursued dependability by involving participants in verifying the accuracy of data interpretations. I enhanced conformability by using email interviews that allowed me to detach from the emotional relationship with the participants through social cues.

Results

Four themes emerged from thematic analysis. The themes are presented below with corresponding quotes from participants.

Table 2. Interview Guide Research Questions and Response

Themes 1: Motivation to Start Vaping

Interview Question 1: Have you ever smoked/vaped? When did you start smoking?

All ten respondents answered this question and all of them had smoked/vaped before. However, the ten respondents started to vape on separate occasions and for assorted reasons. Five of the respondents started vaping because of peer pressure and the quest for social validation. For example, John Doe 002 stated, “To a large extent, I might say that peer pressure influenced my decision about smoking because it looked cool or helped me fit.” John Doe 005 added, “I felt more comfortable using e-cigarettes in social situations. Besides, I must admit that after I became curious about the smell of e-cigarette flavors, I got an initial taste of e-cigarettes from friends.” John Doe 007 described vaping as a “buzzword and trend attractive to the young generation, and I decided to join the movement.” However, vaping emerged as a medical intervention for respondents beyond peer pressure and social validation.

Three of the respondents started vaping as an alternative to smoking cigarettes. Specifically, the three respondents were introduced to vaping to support smoking cessation. For example, respondent Jane Doe 001 stated, “My primary care provider advised me to try vaping as an alternative to traditional nicotine replacement therapy after trying to quit and relapsing severally.” Joh Doe 002 shared the same sentiments by arguing, “Nicotine replacement therapy was not working for me after multiple trials. My therapist recommended vaping as an alternative.” According to Jane Doe 001, “My counselor recommended vaping because chewing gums and patches were not working for

me." These sentiments highlighted the relationship between vaping and smoking cessation. A notable finding was that eight of the ten respondents had smoked cigarettes before transitioning to vaping. The remaining two were smoking and vaping intermittently.

Interview Question 2: Do you vape/use e-cigarettes currently?

All ten respondents answered this question. Seven of the ten respondents were currently vaping. However, five of the seven were vaping exclusively while the remaining two were vaping and smoking cigarettes intermittently. Moreover, two of the five respondents who were vaping exclusively were doing so as a smoking cessation strategy while the remaining three were vaping for social reasons. Jane Doe 001 argued, "I hope that vaping will finally help me to quit smoking." John Doe 002 added, "Vaping has helped me stay away from cigarettes for a while. I hope that I will not relapse again." Three of the remaining were vaping as a recreational and social activity, with no intention of quitting. John Doe 004 stated, "I find vaping to be more socially appealing than smoking cigarettes." John Doe 005 claimed, "Smoking cigarettes is an outdated activity for young people. Vaping is cool without any stigma."

On the other hand, three of ten respondents had neither vaped nor smoked for at least 3 weeks. Two of the respondents had stopped vaping after completing a smoking cessation program. Notably, John Doe 002 asserted, "I used vaping momentarily to help quit smoking after being diagnosed with bronchitis." John Doe 006 added, "I stopped vaping a month ago after completing my smoking cessation program." The other

respondent stopped vaping because of personal reasons after weighing the benefits and risks of vaping. Specifically, Jane Doe 002 stated,

> I used to think vaping was harmless until a friend shared hard evidence about the risks of vaping. I was reluctant at first, but I later decided to quit after conducting my independent research. The rabbit hole was an awakening call for me.

Interview Question 5: How would you rate your own usage of e-cigarettes on a weekly or daily basis?

Ten respondents answered this question, with varying vaping frequencies. Five of the ten respondents were vaping daily although with varying intervals of use. However, five respondents were vaping more in social settings, specifically in parties and clubs. John Doe 002 stated, "I vape more when partying or hanging out with my buddies." John Doe 06 added, "I rarely vape at home. Vaping is fun when there are many participants." Comparatively, two of the ten respondents were vaping occasionally throughout the week. The two were vaping to cope with the urge to smoke cigarettes and not for social reasons. Jane Doe 02 asserted, "I vape when the urge to smoke becomes unbearable. It has been a long journey, but I am almost reaching my goal." On the other hand, the remaining three respondents used to vape but stopped vaping. Responses to Interview Question 2 provide more information about these three respondents' current nonvaping status.

Interview Question 6: Do you have friends who smoke e-cigarettes? If so, how many?

The sixth interview question explored the link between vaping and socialization. All ten respondents answered this question. All ten had at least one friend who vaped. For

instance, P06 stated, “Vaping is a social activity…All my friends are vapers. I guess we would not be friends in real life if we did not vape together.” John Doe 004 concurred by stating, “All my friends vape. We do it for fun and enjoyment.” A notable observation was the link between self-identity and vaping behavior. Vaping respondents indirectly linked vaping identity with friends who promoted e-cigarette use as a socially desirable subculture/lifestyle and endorsed vaping social norms. For example, John Doe 001 said, “E-cigarette use provides me with more benefits that include friends, comfort, and pleasure while relaxing with friends in social situations.” These sentiments resonated with those under the seventh interview question that examined how peer pressure influences cigarette smoking and vaping.

Interview Question 7: To what extent do you believe peer pressure influenced your decisions about smoking?

All ten respondents answered this question. Each identified peer pressure as having played a greater role in influencing their vaping and smoking decisions. The study included young adults aged between 18 years and 25 years. All ten respondents started to smoke cigarettes while in high school because of peer pressure. For example, Jane Doe 003 stated, “My friends had a big impact on my decision to start smoking and vaping.” John Doe 005 added, “I started to smoke because I did not want to be a social misfit in school. All the cool kids were doing it, and I did not want to hang out without friends.” Additionally, John Doe 001 argued, “Everyone I knew in high school was vaping. I went to high school when vaping had peaked in the community, and it had become a cool trend among high schoolers. Nonetheless, only seven of the ten respondents also started to vape

in high school while the remaining three started to vape to support smoking cessation. Interview question one provides more information about the reason that influenced the three respondents' decision to start vaping.

Friends emerged as positive reinforcers for current vapers. When asked about peer pressure from friends, John Doe 005 stated,

> Peer pressure was to blame for the first puff that I took while hanging out with friends. If it were not for them, my guess is that I would not vape in the first place. If you have friends who vape and you ask them what they are taking, they say could you try it…it is common for one to be inclined to say yes.

John Doe 003 agreed by arguing,

> I had a good friend who introduced me to vaping and maintains that he does not like helping his close friends with addictions…but said that he would give me the vape because he felt like it would help me out. He let me try his e-cigarette as a gift and initiated me into the habit.

These findings reinforce the role that friends and peer pressure played in initiating vaping among the respondents. However, the peer influence was greater among younger respondents.

Theme 2: Positive and Negative Characterization of Vaping

Interview Question 3: What is the social benefit of e-cigarette use?

All ten respondents answered this question. Socialization and peer pressure were crucial factors that influenced both cigarette smoking and vaping among all respondents. Responses to interview questions, one, six, and seven capture the social benefits of

vaping for the respondents. Seven of the ten respondents agreed that vaping enhanced socialization and group identity. For example, John Doe 001 said, “E-cigarette use provides me with more benefits that include friends, comfort, and pleasure while relaxing with friends in social situations.” John Doe 005 added, “I started to smoke because I did not want to be a social misfit in school. All the cool kids were doing it, and I did not want to be hanging out without friends.” Therefore, the quest for socialization and social identity was a positive attribute that influenced seven respondents’ decision to start vaping. Three respondents started to vape when they enrolled in a smoking cessation approach. Nevertheless, friends and peer pressure also influenced them to initiate cigarette smoking in adolescence.

Interview Question 4: What are the advantages of Vaping and e-cigarettes over tobacco?

All ten respondents answered this question. Socialization and social identity emerged as important benefits for the respondents. For instance, John Doe 007 said, “E-cigarette enables me to have more friends, relieve stress, and enjoy some comfort at social events.” P07’s sentiments align with responses to questions one, six, and seven. In summary, respondents considered vaping beneficial because it allowed them to form social bonds with other vapers. Consider the case where John Doe 006 argues, “… I guess we wouldn’t be friends in real life if we didn’t vape together.” Jane Doe 003 added, “I would say e-cigarette use is a social event compared to smoking that does not involve shops where people go to sit down, relax, and enjoy your cigarette. Vaping is a great social aspect of relaxing with friends.”

Respondents were attracted to different e-cigarette flavors, linking them to urban trends and social identity. Two respondents specifically highlighted how the assorted flavors have lessened the stigma associated with conventional smoking. For example, John Doe 005 stated, “Flavors in e-cigarettes are fun because one can go for menthol, dragon berry, blueberry, nicotine, or any other flavor, which is a whole thing about e-cigarette use.” Current vapers felt that the flavors were healthier than the unfiltered cigarette smoke. Therefore, non-users did not link vaping to severe health outcomes. For example, when asked whether vaping is unhealthy, P08 stated, “Not really, because I have never experienced any physical, mental, or psychological health issues associated with e-cigarettes.” Jane Doe 001 added, “It is a healthy alternative to tobacco and should not be vilified as harmful.”

Respondents also highlighted the health benefits of vaping, which is consistent with interview question eight. The eighth interview question stated, *“Do you think e-cigarettes affect your health compared to ordinary cigarettes? If so, how?”* Four of the ten respondents characterized vaping as being healthier than cigarette smoking. John Doe 006 argued, “I consider vaping to be healthier and safer than regular cigarettes or conventional smoking.” John Doe 004 also stated, “I have heard that e-cigarettes don’t have the same lung cancer risk as normal cigarettes.” Conversely, three of the ten respondents considered vaping as having no positive health effects. For instance, John Doe 007 stated, “From my point of view, vaping does not have any advantages over tobacco because it is equally addictive and is associated with harmful health effects unknown to the users.” John Doe 01 added, “They have equal effect on health because of

the harmful substances in e-cigarettes and ordinary cigarettes." Jane Doe 002 had the same opinion by stating. "I think vaping affects health like ordinary cigarettes because they contain toxic substances such as nicotine found in the tobacco."

Respondents who characterized vaping as being unhealthy did not cite specific negative health effects of vaping. However, one respondent shared the negative effects vaped based on their lived experiences. Jane Doe 003 reported, "The moment I used e-cigarettes I started to cough, dry mouth, sore throat, and headache, it was a horrible experience. I have also observed my friends report similar experiences, which to me is an indication of the respiratory infection linked with e-cigarettes." John Doe 004 had a different opinion by arguing, "Bad experiences are inevitable when starting something new. I experienced severe coughing and migraines when I started vaping. The symptoms disappeared with continuous vaping. My body is used to it." Moreover, John Doe 007 observed that the transition from cigarette smoking to vaping can lead to withdrawal symptoms. John Doe 007 claimed, "I had a severe rash and dry mouth when I started vaping to help with smoking cessation. The symptoms waned off with time, and I have successfully weaned off vaping."

Seven of the ten respondents were currently vaping while the remaining three were sober. Responses to the second interview question provide more information about the respondents' current vaping/smoking status. A key observation is that current vapers/smokers positively characterized vaping. In contrast, non-vapers/smokers negatively characterized vaping as being harmful to health. Moreover, the three non-vapers/smokers were older, specifically above 23 years while current vapers were much

younger, with a mean age of 19 years. Similarly, respondents with a negative characterization of vaping had used e-cigarettes for longer than those with a positive characterization. Enrolment in a smoking cessation program affected respondents' characterization of vaping, as discussed under the third theme.

Theme 3: The Role of Vaping in Smoking Cessation

Interview Question 9: Have you been part of a smoking cessation program?

All ten respondents answered this question. Four of the ten respondents had been part of a smoking cessation program. Three of the four respondents reported having been introduced to vaping to support smoking cessation. All three were currently non-vapers, and they had completed the smoking cessation program. The remaining respondent relapsed after completing the smoking cessation program. The respondent is currently smoking cigarettes and vaping intermittently. Respondents who enrolled in the smoking cessation program decided for health-related reasons. For example, John Doe 002 decided to quit smoking after being diagnosed with bronchitis. Similarly, John Doe 004 enrolled in a smoking cessation program after researching and finding the negative health effects of vaping.

Interview Question 10: How effective are e-cigarettes as smoking cessation tools?

All ten respondents answered the tenth question. Three of the respondents, John Doe 01, John Doe 02, and Jane Doe 002, reported having used e-cigarettes as an effective smoking cessation tool. John Doe 006 started vaping as an alternative to conventional smoking but relapsed after a week. John Doe 005 currently smokes and vapes intermittently. Another respondent, P05, is currently smoking and vaping. A notable

observation is that five of the ten respondents started vaping as an alternative to conventional vaping while the remaining five were vaping for recreational and social purposes. These findings indicate that e-cigarettes have been an effective smoking cessation tool in three of five (60%) respondents. The remaining five respondents were not aware of vaping as a smoking cessation aid/tool.

Theme 4: Policy Implications

Interview Question 12: What do you think should be the policy on their advertising and usage?

All ten respondents answered this question. Six respondents agreed with the need for advertisers to specify the potential health effects of vaping. Notably, John Doe 007 and Jane Doe 001 argued that e-cigarette advertisements should have the same warning as conventional cigarettes. John Doe 007 stated, “Advertisers continue to market e-cigarettes as a healthier alternative to normal cigarettes. This message is misleading, especially for young people.” Jane Doe 001 argued, “Vaping is now an epidemic among young adults because of distorted marketing. I do not think that advertisers should allowed to continue marketing vaping as a healthy practice.” A major finding is that most respondents were unaware of the negative effects of e-cigarettes. Instead, there was consensus among most respondents to the effect that vaping is healthier than conventional smoking. However, four respondents called for clearer regulations to mitigate the potential effects of vaping and e-cigarettes on human health.

Interview Question 11: Do you have any additional remarks on vaping and e-cigarettes?

All ten respondents answered this question. All respondents have divergent opinions about vaping and e-cigarettes. A contentious issue was whether e-cigarettes should replace conventional cigarettes as healthy alternatives. The respondents felt that vaping was healthier while others had a different opinion. Responses to the twelfth interview question have captured respondents' remarks on vaping and e-cigarettes. Three respondents had used vaping as an effective smoking cessation tool. However, John Doe 007 argued against its use by stating, "Vaping undoubtedly helped me to quit smoking, but I almost ended up being addicted to vaping." I found that vaping had not worked for two respondents intending to quit smoking. Therefore, a pertinent question is whether e-cigarettes are effective smoking cessation aids/tools.

Summary

The results revealed that young adults' experience of vaping was widespread with all participants having ever vaped. However, the perception of knowledge of health risks differed among current users and non-users. The thematic analysis revealed a positive characterization of vaping and e-cigarette use among current users than non-users. Five of the respondents had initiated vaping to support smoking cessation efforts although only four of them had enrolled in smoking cessation programs. Three respondents enrolled in these programs had stopped vaping for at least three weeks before the interview. One respondent had relapsed, and the other one was experimenting with vaping after learning about its potential effectiveness as a smoking cessation aid.

Therefore, current non-users acknowledged the negative effects of vaping and characterized vaping as an effective smoking cessation tool.

On the other hand, five of ten respondents had initiated vaping/e-cigarette use as social activities driven primarily by peer influence. Current users were oblivious to the potential health effects of vaping. Instead, they argued that vaping increased their social agency by expanding their social networks of friends. As such, current vapers were vaping to pursue social identity and belonging in their respective social groups. Friends and peer pressure were instrumental in influencing current vapers' decision to start vaping. Additionally, none of the five current users had attempted to quit vaping or enrolled in a smoking cessation program. Consequently, current vapers described vaping as not having severe health outcomes. Nonetheless, most respondents agreed on the need for clearer information about the potential health effects of vaping, but sentiments diverged on whether health effects are positive, negative, or both.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this qualitative study was to understand the experience of vaping risks among Indiana young adults aged 18-25 years and explore how their knowledge of health risks related to vaping influences their vaping behavior. In this chapter, I expound on the research findings presented in Chapter 4. This chapter also includes information on study limitations and implications for practice and future research.

Interpretation of the Findings

The facts proven in this research are useful to reveal the pattern of vaping among young people and the modification of behavior in young adulthood according to the knowledge of Indiana patients about several hazards of vaping. in this section, I summarize my findings, review the literature, and outline the significance of this research as input for the subject of study. These include gender, ethnicity, and age, concepts evident in the literature review's synthesis of existing knowledge and are used here to connect the offered literature with the study in question.

Seven (70%) of respondents were current vapers while the remaining three (30%) were noncampers. However, two of the seven current vapers had tried quitting but failed to attain this goal. Research findings have shown that 47% of young adults in college had a vaping history and 18.6% had used e-cigarettes within 30 days (Schulenberg et al., 2020). The vaping trend is common among both adolescents and young adults. All respondents included in my study started to vape because of social reasons and peer influence from friends. This is consistent with recent studies that have shown that friends play a critical, supportive role in young adults' vaping by introducing them to e-

cigarettes. Friends aroused the curiosity of participants and allowed them to taste e-cigarettes (Jun et al., 2022).

Marketers are also responsible for influencing vaping behaviors among adolescents and young adults. For example, Lee et al. (2023) found that friends and the vaping industry promote e-cigarette use as a socially desirable lifestyle. Such characterization influences the pursuit of vaping identity among young adults associated with reduced perceptions of health risks and increased vaping behavior. A strong vaping identity reduces the efficacy of anti-vaping campaigns because any message that attacks such identity reduces to quit e-cigarette use (Lee et al., 2023). My research has revealed similar findings by revealing that the ten respondents pursued vaping/e-cigarette use to form a social identity. Most of the respondents agreed that vaping allowed them to gain membership in popular social groups. My study findings provide preliminary research evidence that vaping identity is a significant obstacle to the messages intended to increase vaping harm perceptions among young adults and their intention to quit vaping behavior. Social identity serves as a barrier to quitting, aligning with perceived benefits/barriers constructs of the HBM.

Gender Differences in Vaping Behaviors

I discovered that male participants rated a higher level of vaping as compared to the female participants. These results support previous studies indicating that gender differences existed in vaping profiles. For example, Al-Hamdani et al. (2021) and Jun et al. (2022) also pointed out that more male participants considered vaping as safer than smoking; they had a greater willingness to use e-cigarettes for smoking cessation. In a

similar way, the use of e-vaping was preferred over smoking by male participants in this study due to the social acceptability of use and lower pariah status than smoking. For female participants, however, the source and influence of vaping initiation were influenced by social factors such as family and friends, which aligns with Harrell et al. (2019) on gendered social influence in vaping initiation. However, my study revealed that male participants were also more likely to perceive vaping as being of a similar or lower health risk than smoking, underlining the necessity for sex-sensitive public health campaigns.

Ethnic Variations in Vaping Patterns

Ethnicity was found to play the role of an important predictor in the use of vaping products and perceptions towards the same. From this, it could be concluded that participants with a Caucasian or Asian cultural background included vaping in their safer consumption ideologies because of cultural discourses about health and substance use. This is in line with Atuegwu et al. (2020), who observed higher use of e-cigarettes among non-Hispanic Whites than among other ethnicities. On the other hand, the respondents in this and other studies conducted with the African American population expressed more negative attitudes towards vaping, linked it with health issues. Such findings imply that cultural and ethnic considerations influence the perception and use of vaping products, a gap that previous studies like Mayer et al. (2020) have begun to examine. My study enriches the knowledge of the relationship between ethnicity and perception of health behavior with a call for culturally competent interventions.

Age-Related Trends in Vaping Behaviors

Another predictor of vaping behaviors was age. Regarding the motivation for vaping, younger participants had social motives (18–20 years), while participants from the group 21–25 years used vaping to quit smoking. This result is like that of Bennett et al. (2022), who noted that young people follow the crowd, whereas others consider vaping a better option than smoking to deal with chronic diseases. Nevertheless, my study enriches these findings and reveals the impact of life course transitions, including enrollment in college or the labor market, on vaping practices. This is another important aspect of the study; by focusing on residents of Indiana, the study exposes more local trends that are not easy to decipher from a national study, for instance, the study by Perez et al. (2021) on the effect of COVID-19 on tourism.

Confirmation of Past Research

This study affirmed the findings of prior works on social factors in young adults' use of e-cigarettes. The results make it possible to note a similarity with Kelsh et al. (2023), who pointed out that factors such as peer pressure and social validation concerns are motives for using vapes. As with other participants in this study, they were of a similar opinion, and this is how they described vaping as a social activity that creates group belonging. Also, my study supports the work of Huang et al. (2019), who established that a lower perception of risk is equivalent to a higher level of vaping. Ignoring the hazards to one’s health, all participants described e-cigarettes as less hazardous than regular types of cigarettes, proving that despite increased awareness, marketing and social discourses remain indispensable.

Extension of Existing Knowledge

In addition to replicating previous findings, my work advances the knowledge of vaping behaviors by further elucidating the interdependent relationship between knowledge and behavior. Compared with other studies centered on risk perception (e.g., Jiang et al., 2019), I emphasized the interaction between knowledge increase and behavior alteration. For example, reasons reported by participants who were smoking after keeping off included personal research and targeted interventions, thus unveiling the importance of knowledge dissemination in fighting the social influences of vaping. This convention highlights the need to develop consummate educative initiatives corresponding to youths' daily lives.

Challenging Established Assumptions

Although it reiterated much of what scholars have long known, my study contradicted some widely held expectations. For instance, Cuccia et al. (2020) indicated that acquiring knowledge is insufficient to prevent vaping. However, I discovered that attitude enhanced by the findings made in independent research echoed the intention to quit vaping, suggesting that knowledge does help irrefutably when backed with suitable support. This divergence begs the research question of how knowledge can be re-introduced into vaping cessation initiatives, especially in situations where young adults have access to accurate information.

Contributions to the Field

This study has the following significant implications for public health. First, it gives place-specific data on vaping practices among Indiana youth, which has not been

sampled adequately in national surveys. Second, it underscores the demographic characteristics that form perceptions of vaping and real patterns of its use, which seems more detailed than other existing studies. Third, it mostly emphasizes the possibility of using knowledge and social influences in creating behavior change programs. In these respects, this research enriches the literature on vaping and informs policy and practice with specific recommendations for policymakers and health professionals.

The research unfolded several implications for public health interventions in practice. For example, campaigns for young adults should provide a message about the fact that vaping is gendered, and men perceive its effects as useful for their health. Further, understanding what to make or do within interventions also requires the cultural and ethnic specifications of vaping behaviors and using culturally relevant messages to counter misconceptions. Awareness could also be achieved through programs in schools and colleges where the learners will be enlightened on the health consequences of using e-cigarettes in the future and the untruthful' marketing techniques used to entice people into using e-cigarettes.

Limitations of the Study

The interpretation and application of the study findings are not without certain limitations. The qualitative nature of the study, particularly the collection of self-reported data through email interviews may hinder the interpretation of the findings because of social desirability bias. This may have influenced the extent to which participants disclosed or shared truthful information about their vaping behavior. Even though the study minimized social desirability bias by emphasizing anonymity and confidentiality,

the qualitative nature of the study did not eliminate them. Moreover, the small sample size and limited geographical scope could undermine the generalizability of my findings to diverse populations of young adults. Lastly, the qualitative nature of the study did not explore the causal relationships between knowledge of vaping health risks and vaping behavior. Future studies should design and implement prospective longitudinal studies to ascertain the continuous influence of knowledge on vaping patterns. Further, more explorations need to be made to determine the efficacy of focused strategies in different subgroups of students to support and replicate the current research findings.

Recommendations for Action

Future researchers should consider drawing a large sample of young adults and collecting data through surveys, interviews, and focus group discussions to allow data triangulation. Triangulation will enhance the validity and reliability of research findings. A major observation drawn from my study is the divergent views about the health implications of vaping. Thus, future studies should specifically investigate young people's perceptions of vaping as a health hazard, focusing on the sources of their knowledge. Current vapers, who were mostly younger, had more positive attitudes toward vaping than their older counterparts. Future studies should examine the source of this divergence to inform tailored health educational interventions. Finally, the role of vaping as a smoking cessation tool was also contentious in my study. Future studies should investigate and quantify the extent to which vaping supports smoking cessation.

Implications for Social Change

Vaping is a growing public health concern among the young in the United States. My research findings have shown that young adults were being indoctrinated into vaping/e-cigarette use because of peer pressure and social validation while being oblivious to the potential health implications. The US Surgeon General has identified vaping as a public health epidemic (Jones & Salzman, 2020). According to Jones and Salzman (2020), the false notion that e-cigarettes are a safer alternative to cigarette smoking has contributed to the growing vaping epidemic among young adults. Thus, curbing the youth vaping epidemic should be a priority for health education, highlighting the need for positive social change.

The vaping epidemic was clear following a recent national outbreak of e-cigarette, or vaping, product use-associated lung injury (EVALI). As of February 18, 2020, there were 2,807 EVALI hospitalizations and deaths in all 50 states and the District of Columbia including Puerto Rico and the U.S. Virgin Islands (Werner et al. 2020). Consequently, it follows that such health education programs must be created to enhance the knowledge base surrounding the health risks involved in vaping among adolescents and young adults.

Conclusion

This study investigated the impact of knowledge of the health risks associated with e-cigarettes on the vaping behavior of adult Indiana smokers, as it was determined that vaping behavior among young adults is a prevalent issue. The results indicated that current e-cigarette users but not nonusers perceived that e-cigarettes were less harmful

and addictive than smoking. This perception combined with social friends, flavors, and inadequate participation in the education programs explains vaping behavior among young adults. Given that none of the current e-cigarette users indicated attending any smoking cessation programs, inadequate knowledge may explain continued vaping behavior. The vaping identity may also explain why adults who identified ignore anti-vaping campaigns on the harmful health effects of vaping behavior. Thus, further research on vaping among young should consider this using a large sample in the mixed study to enhance generalizability to a large population of adults.

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Appendix A: Interview Questions

Dear [name of participant],

I am a doctorate student from Walden University and concerned about the health and needs of young adults. You have been picked to participate in an interview-based study that will investigate the knowledge of vaping and e-cigarette use among young adults. The study aims to explore the experiences of young adults overcoming vaping in a smoke cessation program. The following questions are important in confirming eligibility in the study.

Please answer the following:

Question 1: Have you ever smoked/vaped? When did you start smoking?

Question 2: Do you vape/use e-cigarettes currently?

Question 3: What is the social benefit of e-cigarette use?

Question 4: What are the advantages of Vaping and e-cigarettes over tobacco?

Question 5: How would you rate your own usage of e-cigarettes on a weekly or daily basis?

Question 6: Do you have friends who smoke e-cigarettes? If so, how many?

Question 7: Are you willing to share information about the vaping history and it social benefits of vaping/e-cigarette?

Question 8: "Do you think e-cigarettes affect your health compared to ordinary cigarettes? If so, how?"

Question 9: Have you been part of a smoking cessation program?

Question 10: How effective are e-cigarettes as smoking cessation tools?

Question 11: Do you have any additional remarks on vaping and e-cigarettes?

Question 12: What do you think should be the policy on their advertising and usage?

Please find attached complete information about the research study. Please consult before making the final decision. Furthermore, you need to know that you can change your mind even after you confirm participating, there will be no penalty. If interested in the research, please call Martha Kollison (317-777-8447).

Appendix B: Screening Questions

1. Have you worked in a hospital or health insurance company that has experienced at least one data breach since the pandemic began?
    - Yes
    - No
2. Are you directly responsible for investigating cybersecurity risks or attacks within your organization?
    - Yes
    - No
3. Do you play a role in developing counter-security measures to protect against cybersecurity threats in your organization?
    - Yes
    - No
4. Do you have experience specifically related to the security of Internet of Medical Things (IoMT) devices within your organization?
    - Yes
    - No
5. Do you hold a professional title or position that is focused on cybersecurity within your organization (e.g., Chief Information Security Officer, Security Analyst)?
    - Yes
    - No

6. Have you been involved in responding to ransomware attacks or developing strategies to mitigate such attacks in your organization?
    - Yes
    - No
7. Are you currently employed in a cybersecurity role at a hospital or health insurance company?
    - Yes
    - No
8. Are you knowledgeable about the current trends and threats related to ransomware attacks affecting the healthcare industry?
    - Yes
    - No